

CLAIMS

1. An extraction device for mating with a carrier comprising:
a carrier-receiving portion at a first end; and
a conduit interconnected to the carrier-receiving portion; the conduit
extending between the carrier-receiving portion and a second end;
wherein the carrier-receiving portion is adapted to receive a carrier such
that a reservoir is formed.
2. The extraction device of claim 1 wherein the reservoir has a volume of
approximately 0.01 to 250 μL .
3. The extraction device of claim 1 wherein the second end is adapted to
mate with a vessel such that the vessel is in fluid communication with the conduit.
4. The extraction device of claim 1 wherein the reservoir includes at least a
portion of the carrier and at least a portion of the conduit.
5. The extraction device of claim 1 wherein the reservoir is substantially
sealed at the carrier.
6. An extraction device for mating with a carrier comprising:
a carrier-receiving portion at a first end; and
a conduit interconnected to the carrier-receiving portion; the conduit
extending between the carrier-receiving portion and a second end;
wherein the carrier-receiving portion is adapted to receive a carrier having
a transfer film such that a reservoir is formed and at least a portion of the transfer
film is disposed within the reservoir.

7. The extraction device of claim 6 wherein the carrier-receiving portion is adapted to receive the carrier such that at least a portion of the transfer film is disposed outside the reservoir.
8. The extraction device of claim 7 wherein the at least a portion of the transfer film disposed outside the reservoir includes at least one stand-off portion.
9. The extraction device of claim 7 wherein at least a portion of the transfer film disposed outside the reservoir includes matter transferred to the transfer film by non-specific transfer micro-capture.
10. The extraction device of claim 6 wherein the at least a portion of the transfer film disposed within the reservoir includes matter transferred to the transfer film by specific transfer microcapture.
11. An extraction device for mating with a carrier comprising:
 - a carrier-receiving portion at a first end; and
 - a conduit interconnected to the carrier-receiving portion;wherein the carrier-receiving portion is adapted to receive a carrier to form a reservoir and further adapted to selectively cover at least a portion of the carrier.
12. The extraction device of claim 11 wherein the at least a portion of the carrier includes a stand-off portion.
13. The extraction device of claim 11 wherein the at least a portion of the carrier is sealed from the reservoir.
14. An extraction system comprising:
 - a carrier having a transfer film; and

an extraction device being removably coupled to the carrier; the extraction device comprising a carrier-receiving portion interconnected to at least one conduit; the carrier-receiving portion being adapted to receive the carrier such that a reservoir is formed.

15. The extraction system of claim 14 wherein at least a portion of the carrier is disposed within the reservoir.

16. The extraction system of claim 14 wherein the extraction device is adapted to mate with a vessel such that the vessel is in fluid communication with the conduit.

17. The extraction system of claim 14 wherein the reservoir provides a locale for processing fluid on the transfer film.

18. The extraction system of claim 14 further including a gasket disposed between the carrier and the extraction device.

19. The extraction system of claim 14 wherein the reservoir is substantially sealed.

20. The extraction system of claim 14 further including securing features adapted to secure the carrier to the carrier-receiving portion.

21. The extraction system of claim 20 wherein the securing features are selected from the group consisting of a compression-fit engagement between the carrier and the extraction device, a snap-fit engagement between the carrier and the extraction device, a lock-and-key engagement between the carrier and the extraction device, and an adhesive engagement between the carrier and the extraction device.

22. An extraction device for mating with a carrier comprising:
a carrier-receiving portion at a first end; the carrier-receiving portion including a shoulder and at least one flange; the at least one flange extending from the shoulder; the carrier-receiving portion further including a landing portion having a landing surface; the landing surface defining an inner opening; and
a conduit interconnected to the carrier-receiving portion at the inner opening; the conduit extending between the carrier-receiving portion and a second end;
wherein the carrier-receiving portion is adapted to receive a carrier and to form a reservoir by the carrier contacting the landing portion.
23. The extraction device of claim 22 wherein the landing surface is raised from the shoulder.
24. The extraction device of claim 23 wherein the landing surface is raised from the shoulder to generate a force response upon the inserted carrier such that the carrier is retained within the extraction device under mechanical and thermal strains.
25. The extraction device of claim 22 further including a rim at the first end; the rim having a beveled surface adapted to guide the insertion of the carrier into the carrier-receiving portion.
26. The extraction device of claim 22 wherein the carrier-receiving portion includes four flanges; each flange being curved to collectively encompass the carrier.
27. The extraction device of claim 22 further including securing features adapted to secure the carrier to the carrier-receiving portion.
28. The extraction device of claim 27 wherein the securing features are selected from the group consisting of a compression-fit engagement between the

carrier and the extraction device, a snap-fit engagement between the carrier and the extraction device, a lock-and-key engagement between the carrier and the extraction device, and an adhesive engagement between the carrier and the extraction device.

29. The extraction device of claim 22 wherein the conduit is adapted to mate with a vessel at the second end.

30. The extraction device of claim 29 wherein the vessel is a centrifuge tube or microtiter plate.

31. The extraction device of claim 22 further including a gasket having a central aperture; the gasket being disposed on the landing portion such that the central aperture coincides with the inner opening.

32. The extraction device of claim 31 wherein the gasket further includes at least one aperture adapted to receive the at least one flange.

33. The extraction device of claim 22 wherein a fluidic barrier is formed with the carrier at the inner opening such that fluid is retained in the reservoir.

34. The extraction device of claim 33 wherein the fluidic barrier withstands temperatures of approximately -20 to 100 °C.

35. The extraction device of claim 22 wherein the reservoir is defined by the conduit and at least a portion of the carrier encompassed by the inner opening.

36. The extraction device of claim 35 wherein the carrier includes a transfer film coupled to a substrate surface; the portion of the carrier encompassed by the inner opening including a portion of the transfer film such that the portion of the transfer film is disposed inside the reservoir.

37. The extraction device of claim 22 wherein the carrier includes at least one stand-off portion; the stand-off portion being disposed outside the reservoir.

38. An extraction device for mating with a carrier comprising:

a carrier-receiving portion at a first end; the carrier-receiving portion including an inner surface, a recess, and a landing portion; the recess being interconnected with the inner surface and the landing portion; the landing portion forming a landing rim that is raised from the recess; the landing rim defining an inner opening; and

a conduit interconnected to the carrier-receiving portion at the inner opening; the conduit extending between the carrier-receiving portion and a second end;

wherein the carrier-receiving portion is adapted to receive a carrier and to form a reservoir by the carrier contacting the landing rim.

39. The extraction device of claim 38 further including a rim at the first end; the rim having a beveled surface adapted to guide the insertion of the carrier into the carrier-receiving portion.

40. The extraction device of claim 38 further including securing features adapted to secure the carrier within the carrier-receiving portion.

41. The extraction device of claim 40 wherein the securing features are selected from the group consisting of a compression-fit engagement between the carrier and the extraction device, a snap-fit engagement between the carrier and the extraction device, a lock-and-key engagement between the carrier and the extraction device, and an adhesive engagement between the carrier and the extraction device.

42. The extraction device of claim 38 wherein the conduit is adapted to mate with a vessel at the second end.
43. The extraction device of claim 38 wherein the vessel is a centrifuge tube or microtiter plate.
44. The extraction device of claim 38 wherein a fluidic barrier is formed with the carrier at the inner opening such that fluid is retained in the reservoir.
45. The extraction device of claim 38 wherein the fluidic barrier withstands temperatures of approximately -20 to 100 °C.
46. The extraction device of claim 38 wherein the reservoir is defined by the conduit and a portion of the carrier encompassed by the inner opening.
47. The extraction device of claim 46 wherein the carrier includes a transfer film coupled to a substrate surface; the portion of the carrier encompassed by the inner opening including a portion of the transfer film such that the portion of the transfer film is disposed inside the reservoir.
48. The extraction device of claim 38 wherein the carrier includes at least one stand-off portion; the stand-off portion being disposed outside the reservoir.
49. The extraction device of claim 38 wherein the carrier contacts the landing rim such that the landing rim forms a fluidic barrier with the carrier such that fluid is retained in the reservoir.
50. The extraction device of claim 38 wherein the landing rim forms a pointed edge.

51. The extraction device of claim 38 wherein the carrier includes a transfer film; the landing rim impresses upon the transfer film to form a fluidic barrier at the inner opening.

52. An extraction device for mating with a carrier comprising:
a carrier-receiving portion at a first end; the carrier-receiving portion including an inner surface, a landing portion, and a reservoir forming surface; the landing portion being interconnected with the inner surface and the reservoir-forming surface; the reservoir forming surface being encompassed by the landing portion; and

at least one conduit interconnected to the carrier-receiving portion; the conduit extending between the reservoir-forming surface and a second end;

wherein the carrier receiving portion is adapted to receive a carrier and to form a reservoir by the carrier contacting the landing portion.

53. The extraction device of claim 52 further including a recess interconnected with the inner surface and the landing portion.

54. The extraction device of claim 52 wherein the landing portion is raised from the reservoir-forming surface.

55. The extraction device of claim 52 further including a rim at the first end; the rim having a beveled surface adapted to guide the insertion of the carrier into the carrier-receiving portion.

56. The extraction device of claim 52 further including securing features adapted to secure the carrier to the carrier-receiving portion.

57. The extraction device of claim 52 wherein the securing features are selected from the group consisting of a compression-fit engagement between the carrier and the extraction device, a snap-fit engagement between the carrier and

the extraction device, a lock-and-key engagement between the carrier and the extraction device, and an adhesive engagement between the carrier and the extraction device.

58. The extraction device of claim 52 wherein the at least one conduit is adapted to mate with a vessel at the second end.

59. The extraction device of claim 58 wherein the vessel is a centrifuge tube or microtiter plate.

60. The extraction device of claim 52 wherein a fluidic barrier is formed with the carrier such that fluid is retained in the reservoir.

61. The extraction device of claim 52 wherein the carrier includes a transfer film coupled to a substrate surface; the portion of the carrier encompassed by the landing surface opening including a portion of the transfer film such that the portion of the transfer film is disposed inside the reservoir.

62. The extraction device of claim 52 wherein the reservoir exhibits capillarity.

63. The extraction device of claim 52 wherein the reservoir has a volume of approximately 0.01 to 250 μL .

64. The extraction device of claim 52 wherein the at least one conduit is a capillary.

65. An extraction device for mating with a carrier comprising:
a first surface;
a second surface;
an outer surface; and

an inner surface; the first and second surfaces being interconnected by the outer and inner surfaces; the inner surface defining a conduit extending between the first surface and the second surface;

wherein a reservoir is formed by the carrier being joined at the first surface such that the reservoir is defined by the carrier and the conduit.

66. The extraction device of claim 65 wherein the first surface includes an adhesive material.

67. The extraction device of claim 65 wherein the second surface includes an adhesive material.

68. The extraction device of claim 65 wherein the first surface is adapted to cover a portion of the carrier having unwanted material.

69. The extraction device of claim 65 wherein a fluidic barrier is formed between the inner surface and the carrier.

70. The extraction device of claim 65 wherein the reservoir has a volume of approximately 0.01 to 250 μL .

71. The extraction device of claim 65 wherein the reservoir provides a locale for fluid processing.

72. An extraction device delivery system comprising:
a base; and
a locator connected to the base;
wherein the locator includes at least one aperture adapted to receive at least one extraction device.

80. The method of claim 79 wherein the step of transferring matter to the transfer film includes transferring matter to the transfer film by specific transfer microcapture; and

further including the step of disposing matter that is adhered to the transfer film by specific transfer microcapture within the reservoir.

81. The method of claim 79 wherein the step of transferring matter to the transfer film includes transferring matter to the transfer film by non-specific transfer micro-capture; and

further including the step of substantially excluding matter that is adhered to the transfer film by non-specific transfer microcapture from the reservoir.

82. The method of claim 79 wherein the step of providing a carrier having a transfer film includes providing a carrier with at least one stand-off portion; and further including the step of covering the at least one stand-off portion.

83. A method of delivering at least one extraction device comprising the steps of:

providing an extraction device delivery system comprising a base; and

a locator connected to the base;

wherein the locator includes at least one aperture adapted to receive at least one extraction device;

providing at least one extraction device;

disposing the at least one extraction device within the at least one aperture;

providing a carrier having a transfer film;

passing the carrier through the locator such that the transfer film contacts the at least one extraction device;

adhering the carrier to the extraction device to form a carrier-extraction device combination; and

removing the carrier-extraction device combination.

84. The method of claim 83 wherein the step of providing an extraction device delivery system includes providing a guide connected to the locator.

85. The method of claim 84 further including the step of passing the carrier through the guide.

86. The method of claim 83 wherein the step of providing an extraction device delivery system further includes providing a first adhesive layer between the base and the locator.

87. The method of claim 86 wherein the first adhesive layer includes a first surface and a second surface; the locator being joined to the first surface and the base being joined to the second surface; the step of providing a first adhesive layer further includes providing a first adhesive layer wherein at least a portion of the first surface has an adhesive tack that is lower than the second surface.

88. The method of claim 87 wherein the step of providing a first adhesive layer includes providing a first adhesive layer wherein the at least a portion of the first surface having an adhesive tack that is lower than the second surface is located substantially in line with the at least one aperture.

89. The method of claim 84 wherein the step of providing an extraction device delivery system includes providing a second adhesive layer between the locator and the guide; the guide having at least one guide aperture.

90. The method of claim 84 wherein the step of providing an extraction device delivery system includes providing a cover.

91. A method for extraction comprising the steps of:

transferring matter to a carrier by microcapture;
providing an extraction device having a carrier-receiving portion and at least one conduit;
inserting the carrier into the carrier-receiving portion;
forming a reservoir comprising at least one surface of the extraction device and at least one surface of the carrier; the reservoir being interconnected to the at least one conduit;
introducing fluid into said reservoir via the at least one conduit to extract matter on the transfer film; and
removing said fluid.

92. The method of claim 91 wherein the step of removing fluid includes the steps of:
- providing a vessel;
 - mating the vessel to the extraction device such that the conduit and vessel are in fluid communication; and
 - transferring fluid from the reservoir to the vessel.